



National Park Service North Pacific/ Columbia Basin Fire Ecology Annual Report Calendar Year 2020

Karen Kopper, Fire Ecologist
Cedar Drake, Lead Fire Effects Monitor

A. Summary

Despite unanticipated challenges posed by the Coronavirus pandemic, the North Pacific/Columbia Basin (NPCB) Fire Ecology program experienced one of its most productive and varied seasons ever. The fire effects monitoring crew completed 78 plot reads within North Cascades National Park (NOCA), Olympic National Park (OLYM), San Juan Island National Historical Park (SAJH), and Lake Roosevelt National Recreation Area (LARO). Furthermore, NPCB crew members offered substantial support to a wide variety of incidents throughout California and Colorado in the capacity of Lead READ, REAF, and FEMO.

Early Season: In early 2020 the Lead Monitor received funding from the Pacific West Region to update the NPS Resource Advisor Course curriculum and teach N-9042 courses at Hawaii Volcanoes NP (HAVO), the NPS Southeast Regional Office in Atlanta, and a virtual course hosted by North Cascades National Park. Two seasonal monitors onboarded in late April/ early March and worked remotely through the beginning of June. During this time period, monitors completed required trainings, an N-9042 (Wildland Resource Advisor) course, and updated FMH species lists by NPS unit relative to ITIS naming conventions and those reflected in the newest version of *Flora of the Pacific Northwest*. Additionally, the Lead Monitor conducted a rare plant survey in a proposed fuels treatment unit at LARO.

Mid Season: Field work began in earnest at the beginning of June with the crew travelling to SAJH to conduct a spring read of the ongoing Young Hill Brome Treatment experiment. Immediately afterwards the crew transitioned to Stehekin (NOCA) to complete FMH plots. In mid-June the crew travelled to LARO to conduct a second round of rare plant surveys and complete a series of FMH plot reads. The pay period was rounded out by participation in a pre-season NOCA Fire Management Team meeting and readiness review. In July and August, the crew returned to both Stehekin and LARO twice for four eight-day trips to conduct FMH plot reads. In late August/ early September the two seasonal monitors returned to LARO once again to conduct an initial round of rare plant surveys near Grand Coulee followed by a visit to SAJH to complete the fall read of the Brome Treatment Experiment.

Late Season: In late August the Lead monitor traveled to Point Reyes National Seashore (PORE) to serve as Lead READ on the Woodward fire for 16 days followed by an additional 12 days as Lead READ on the

Cameron Peak Fire at Rocky Mountain National Park (ROMO). He returned to the Woodward Fire as Lead READ in mid-October for a 21-day assignment followed by an additional 7 days as Lead READ on the North Zone of the August Complex on the Six Rivers National Forest. Meanwhile, the Fire Ecologist coordinated several assignments for the two seasonal fire effects monitors. First they were assigned to the SQF Complex on the Sequoia National Forest as REAF(t)s for a 14-day assignment. Afterwards they conducted an 8-day backcountry trip with a German graduate student to revisit 32 CBI plots from the 2017 Hayes 2 Fire at OLYM. Following this trip the two monitors travelled to the Red Salmon Complex on the Klamath National Forest where they served as FEMO(t)s on the national Fire Behavior Analysis Team (FBAT) for 5 days followed by a 9-day assignment to the North Complex on the Plumas National Forest as REAF(t)s. Finally, the monitors travelled to the Blue Jay fire at Yosemite National Park (FEMO) for 12 days to serve as FEMO(t)s tasked with conducting post-burn assessments and CBI plots in conjunction with the Grand Tetons Fire Effects crew.



Reading an FMH plot at LARO

Table 1. Fire Effects Plot Workload (2020) and Total Plots Installed

Park	Monitoring Unit	Plot Type	Pre-burn 2020	Immed. Post 2020	Postburn (1-20 yrs.) 2020	Annual Total (2020)	Total Plots
North Cascades NP	Stehekin Valley FFRA: Mixed Conifer	FMH Forest	0	0	16	16	52
	Stehekin Valley Contours (Open/Mid/Closed Canopy Mixed Conifer)	FMH Forest	0	0	0	0	23
	Douglas Fir/ Western Hemlock/ Western Red Cedar	Westside Fuels Reduction	0	0	0	0	6
Lake Roosevelt NRA	Ponderosa Pine/ Common Snowberry Forest	FMH Forest	0	0	18	18	63
	Ponderosa Pine/Bitterbrush	FMH Forest	0	0	0	0	3
San Juan Island NHP	Garry Oak Woodland	FMH Forest	0	0	0	0	12
	Non-Native Brome	Experimental	0	0	12 (6 spring + 6 fall reads)	12	6
	Douglas Fir/ Lodgepole (permanent RAPS plots)	Rapid Assessment	0	0	0	0	4
	Annual Brome Grasses	FMH Grass	0	0	0	0	10
	Coastal Prairie Grassland	FMH Grass	0	0	0	0	12
John Day Fossil Beds NM	Big Sagebrush/Bunchgrass	FMH Brush	0	0	0	0	21
	Western Juniper Shrubland	FMH Forest	0	0	0	0	16
Olympic NP	East-side Mixed Conifer (permanent RAPS plots)	Rapid Assessment	0	0	0	0	5
	Subalpine Fir/ Mountain Hemlock: Hayes 2 fire (2016)	CBI (revisit)	0	0	32	32	32
Whitman Mission NHS	Giant Wild Rye Meadow Restoration	FMH Grass	0	0	0	0	5
Total			0	0	78	78	316

* Pilot sampling plots

Table 2. Fire Ecology Staffing 2020

Ecologist and Monitors	Starting Date	Ending Date	# of Pay Periods	READ Qualified (Yes or No)	Training and Development
Karen Kopper Fire Ecologist	1/01/20	n/a	26	No	Supervisor training, UW doctoral research, READ course
Cedar Drake Lead Fire Effects Monitor	1/19/20	12/31/19	25	Yes	RT-130, instructed three N-9042 (Wildland READ) courses, Lead READ assignments, online Plant Ecology college course, participation on NWCG READ Subcommittee
Ian Woodruff Fire Effects Monitor	4/26/20	11/7/20	14	Yes	RT-130, N-9042, initiated FEMO taskbook, FEMO(t) and REAF(t) assignments
Noah Hirsch Fire Effects Monitor	5/10/20	11/21/20	14	Yes	RT-130, N-9042, initiated FEMO taskbook, FEMO(t) and REAF(t) assignments

2020 North Pacific/ Columbia Basin Fire Ecology Crew



Karen Kopper, Fire Ecologist



Cedar Drake, Lead Fire Effects Monitor



Noah Hirsch, Fire Effects Monitor



Ian Woodruff, Fire Effects Monitor

North Cascades National Park Ponderosa Pine / Douglas Fir Forest



FPSME2-56 Q1-O4, PRE Treatment (2015)



FPSME2-57 P2-O, PRE Treatment (2016)



FPSME2-56 Q1-Q4, POST Treatment (2020)



FPSME2-57 P2-O, POST Treatment (2020)

Table 3a NOCA Management Objectives and Monitoring Results

Upper McGregor Unit : (2012 – 2020), n = 5, # of fires = 1

Management Objectives (Restoration)	Monitoring Results: PRE = Pre-Treatment Average (standard deviation) YR02 = Two Years Following 1 st Pile Burn (standard deviation)	Achieved?
Trees		
Reduce the density of live saplings and pole size trees (1 – 6” dbh) to 10-30 trees/acre as measured 2 years after final treatment prior to maintenance.	Upper McGregor unit: n = 5 PRE = 51.0 (16.8) trees/acre YR02 = 32.4 (16.9) trees/acre	No
Reduce the density of live small and medium sized overstory trees (6-24” dbh) to 25-75 trees/acre as measured 2 years after final treatment prior to maintenance.	Upper McGregor unit: n = 5 PRE = 106.8 (9.3) trees/acre YR02 = 77.7 (8.8) trees/acre	No
Maintain the density of large overstory trees (>24” dbh) at 1-20 trees/acre as measured 2 years after final treatment prior to maintenance.	Upper McGregor unit: n = 5 PRE = 12.1 (5.0) trees/acre YR02 = 12.9 (5.3) trees/acre	Yes
Reduce live basal area to an average of 70 (± 35) ft²/ acre as measured 2 years after final treatment prior to maintenance.	Upper McGregor unit: n = 5 PRE = 184.8 (19.3) ft ² / acre YR02 = 163.5 (19.2) ft ² / acre	No
Increase seedlings (<1 m. tall) and saplings (1-3 m. tall) to 25 – 75 PIPO live seedlings per acre by 2 years post-treatment.	Upper McGregor unit: n = 5 PRE = 0 (0) PIPO seedlings/ acre, 0 (0) PIPO saplings/ acre YR02 = 94.7 (125.4) PIPO seedlings/ acre, (0) 0 PIPO saplings/ acre	No (Over-achieved)
Increase live canopy base height to 2 meters as measured 1-year post-treatment.	Upper McGregor unit: n = 5 PRE = 10.0 (1.4) m. YR02 = 10.6 (1.1) m.	Yes

Vegetation		Objective Achieved?
Maintain a minimum of 30 percent cover of live native understory vegetation 2 years after the initial treatment.	Upper McGregor unit: n = 5 PRE = 40.0 (19.8) % cover of native understory vegetation YR02 = 56.2 (19.0) % cover of native understory vegetation	Yes
Report percent cover of non-natives per species. Alert managers to the presence of new exotic species, and work with them to determine critical thresholds.	Upper McGregor unit n = 5 No non-native species encountered in either the PRE or YR02 plot reads.	-
Fuel Load		Objective Achieved?
Maintain an average small diameter (1-100 hour) fuel load of 2-6 tons/acre 2 years after final treatment prior to maintenance.	Upper McGregor unit: n = 5 PRE = 4.0 (2.4) tons/acre YR02 = 5.8 (2.9) tons/acre	Yes
Maintain an average large diameter (1000 hour) fuel load of 4-12 tons/acre 2 years after final treatment prior to maintenance.	Upper McGregor unit: n = 5 PRE = 18.6 (14.9) tons/acre YR02 = 15.9 (12.0) tons/acre	No
Maintain an average litter and duff load of 3.5-14 tons/acre 2 years after final treatment prior to maintenance.	Upper McGregor unit: n = 5 PRE = 22.3 (4.9) tons/acre YR02 = 25.1 (3.9) tons/acre	No

NOCA Upper McGregor: Two Years Following Pile-burn of Selective Thin

This is a summary of the second-year post-treatment effects of a unit that was selectively thinned and hand-pile burned to reduce hazard fuels, promote resiliency of leave trees and maintain spotted owl habitat. This was the first habitat-enhancing thinning treatment of its kind at NOCA, so the overstory thinning was marked conservatively with the intention of creating gaps through the removal of a few large diameter trees (> 24" dbh) and a moderate number of mid-story canopy trees per acre. Care was taken to maintain a diversity of age-classes and clumps of trees. In 2017 through 2019 the crew thinned and pile-burned smaller diameter trees. Five plots were read pre-treatment, post-thin and post-pileburn.

Trees: The understory thinning of saplings and pole-size trees (1-6" diameter class) was conservative (32.4 remaining trees/acre) but moved the unit towards our desired goal of 10-30 small diameter trees per acre. This is a favorable result which puts the unit in good shape for an understory burn, which is likely to further reduce the number of small diameter trees.

The contract thin also made good progress towards our tree density objectives. Small and medium sized overstory trees (6-24" diameter class) were thinned to 77.7 trees per acre, just slightly above the desired goal of 25-75 trees/acre. Interestingly, although a few select large overstory trees (>24" dbh) were

removed, the overall impact of the thinning increased the density of the largest trees from 12.1 trees per acre to 12.9 trees per acre. This result indicates that some of the medium sized trees graduated to the large diameter class. This is clear confirmation that the resiliency prescription is working.

A preponderance of Ponderosa pine seedlings (YR02=94.7 seedlings/acre) where there were previously none (PRE=0 seedlings/acre) is another sign that the prescription is working. Ponderosa pine seedlings are thriving in the canopy gaps that have been created.

The overall basal area of the unit is still greater than desired; currently 163.5 ft²/acre compared to a desired basal area of 35–105 ft² per acre. This suggests that further thinning is required to meet our hazard fuel reduction goals; however, we are moving in the right direction. Fortunately, the average canopy base height (10.6 meters) remains comfortably above the minimum desired condition (2 meters), helping to prevent future surface fires from escalating into active crown fires.

Vegetation: The understory in the Upper McGregor unit is in excellent shape. The cover of understory vegetation increased from 40 percent pre-treatment to 56.2 percent post-pileburn and is comprised entirely of native species. Perennial grasses and sedges are especially abundant, with Alaska oniongrass (*Melica subulata*) boasting a 21 percent cover, and Ross' sedge (*Carex rossii*), Blue wild rye (*Elymus glaucus*) and Western fescue (*Festuca occidentalis*) at 3.4, 2.7 and 3 percent cover respectively. Shrubs such as Spreading dogbane (*Apocynum androsaemifolium*) (2.2. percent cover) and white spiraea (*Spiraea betulifolia*) (5.1 percent cover) are also abundant. Lastly, Largeleaf sandwort (*Moehringia macrophylla*) is the most plentiful forb (7.4 percent cover).

Fuels: Not surprisingly, thinning resulted in an increase in both small diameter (1-100 hour) fuel loadings and average litter and duff loads in the unit. Small diameter fuel loadings increased by 45 percent (PRE=4.0, YR02=5.8 tons/acre), remaining just within the high-end of their desired range of 2-6 tons per acre. Litter and duff only increased by 12.5 percent (PRE=22.3, YR02=25.1 tons/acre), but this is well above the desired range of 3.5 to 14 tons per acre.

The large diameter (1000 hr) fuel loading decreased by 14.5 percent (PRE=22.3, YR02=25.1 tons/acre), but this is still above the desired range of 4 to 12 tons per acre.

Recommendations: The unit has improved considerably in terms of fire resistance and resilience to future wildfires. Importantly, it also continues to function as critical habitat for spotted owl. Two treatments could further advance the progress that has been made:

- 1) An understory burn is recommended to reduce dead and downed fuel loadings, and potentially reduce sapling tree densities. Burning will undoubtedly kill many of the Ponderosa pine seedlings that have recently sprouted; however, reducing litter and duff should enable seedling densities to bounce back quickly.
- 2) A second overstory thin is advised to further reduce medium overstory tree (6-24" diameter) densities and increase forest gaps. This will provide increased fire protection. Care should continue to be taken to maintain tree clumps for Spotted Owl habitat.

Lake Roosevelt National Recreation Area Ponderosa Pine / Snowberry Forest



FPIPO1-32 Q2-Q3, PRE Treatment (2013)



FPIPO1-34 50P-O, PRE Treatment (2013)



FPIPO1-32 Q2-Q3, Year02 Treatment (2017)



FPIPO1-34 50P-O, POST Treatment (2017)

Table 3b LARO Management Objectives and Monitoring Results

Bradbury Unit: (2010 – 2020), n = 6, # of fires = 2

Management Objectives (Restoration)	Monitoring Results: PRE = Pre-Burn Average (standard deviation) YR02 = Two Years Following 2 nd Pile Burn Average (standard deviation) YR05 = Five Years Following 2 nd Pile Burn Average (standard deviation)	Achieved ?
Trees		
Reduce the density of live pole size trees (1-6" dbh) to 2-20 trees/acre as measured 2 years after final treatment prior to maintenance.	Bradbury unit: n = 6 PRE = 13.5 (14.4) trees/acre YR02 = 14.8 (12.7) trees/acre YR05 = 15.5 (14.3) trees/acre	Yes
Reduce the density of live small and medium sized overstory trees (6-24" dbh) to 25-75 trees/acre as measured 2 years after final treatment prior to maintenance.	Bradbury unit: n = 6 PRE = 137.6 (41.4) trees/acre YR02 = 135.6 (38.8) trees/acre YR05 = 133.5 (39.0) trees/acre	No
Maintain or increase the density of live large overstory trees (> 24" dbh) to 1-8 trees/acre as measured 5 years after final treatment prior to maintenance.	Bradbury unit: n = 6 PRE = 2.7 (3.3) trees/acre YR02 = 2.7 (3.3) trees/acre YR05 = 3.4 (4.0) trees/acre	Yes
Reduce live mean basal area (poles+overstory) to an average of 70 (±35) ft ² /acre as measured 2 years after final treatment prior to maintenance.	Bradbury unit: n = 6 PRE = 141.0 (42.2) ft ² /acre YR02 = 144.4 (43.3) ft ² /acre YR05 = 146.6 (42.7) ft ² /acre	No
Increase live canopy base height (poles + overstory) to 2 meters as measured 1-year post-treatment.	Bradbury unit: n = 6 PRE = 10.6 (3.1) m. YR02 = 10.5 (2.1) m. YR05 = 10.9 (2.3) m.	Yes

Table 3b LARO Management Objectives and Monitoring Results

Bradbury Unit: (2010 – 2020), n = 6, # of fires = 2

Management Objectives (Restoration)	Monitoring Results: PRE = Pre-Burn Average (standard deviation) YR02 = Two Years Following 2 nd Pile Burn Average (standard deviation) YR05 = Five Years Following 2 nd Pile Burn Average (standard deviation)	Achieved ?
Reduce the density of seedlings (<1 meter tall) and saplings (1-3 meters tall) to 2-20 live trees/acre as measured 2 years after final treatment prior to maintenance.	Bradbury unit: n = 6 PRE = 825.4 (755.4) seedlings/ acre, 13.5 (18.9) saplings/acre YR02 = 1,159.9 (735.2) seedlings/ acre, 21.6 (28.3) saplings/acre YR05 = 29,233.7 (19,303.2) seedlings/ acre, 16.2 (27.1) saplings/acre	No
Vegetation		
Maintain a minimum of 30 percent cover of live native understory vegetation 2 years after initial treatment.	Bradbury unit: n = 6 PRE = 9.7 (4.6) % native understory cover YR02 = 6.3 (8.9) % native understory cover YR05 = 22.7 (10.1) % native understory cover	No
Maintain <20% cover of live non-native understory species <u>relative to total cover</u> by 5 years following treatment.	Bradbury unit: n = 6 PRE = 6.3 % relative non-native understory cover YR02 = 17.8 % relative non-native understory cover YR05 = 13.2 % relative non-native understory cover	Yes
Fuels		
Maintain an average small diameter (< 3 inch) woody fuel load of 2–6 tons/acre 2 years after final treatment prior to maintenance.	Bradbury unit: n = 6 PRE = 3.7 (1.3) tons/acre YR02 = 3.2 (1.8) tons/acre YR05 = 3.1 (0.8) tons/acre	Yes

Table 3b LARO Management Objectives and Monitoring Results**Bradbury Unit:** (2010 – 2020), n = 6, # of fires = 2

Management Objectives (Restoration)	Monitoring Results: PRE = Pre-Burn Average (standard deviation) YR02 = Two Years Following 2 nd Pile Burn Average (standard deviation) YR05 = Five Years Following 2 nd Pile Burn Average (standard deviation)	Achieved ?
Maintain an average large diameter ($\geq$ 3 inch) woody fuel load (no litter and duff) of 1-10 tons/acre 2 years after final treatment prior to maintenance.	Bradbury unit: n = 6 PRE = 154.7 (19.6) tons/acre YR02 = 76.9 (15.3) tons/acre YR05 = 25.9 (11.4) tons/acre	No
Maintain an average litter and duff fuel load of 3.5-14.0 tons/acre 2 years after final treatment prior to maintenance.	Bradbury unit: n = 6 PRE = 28.2 (17.1) tons/acre YR02 = 29.7 (8.9) tons/acre YR05 = 29.2 (6.6) tons/acre	No

LARO: Fifth-year post treatment effects of pile burning in Bradbury Unit

This is an assessment of stand conditions five years after pile-burning in the Bradbury Unit. The unit was pile-burned to reduce slash from previous hand-piles and thinning projects. The primary objectives of the pile-burns were to reduce ladder fuels, including the slash. Now that the slash has been burned, we assess the stand conditions and consider further treatments.

Trees: Tree densities were not significantly reduced in any of the size classes. The densities of pole-size trees (1-6" diameter) and large overstory trees (> 24" diameter) were within the desired ranges of 2-20 trees/acre and 1-8 trees/acre, respectively before and following pile-burning. Therefore, there was no need for further thinning. However, the small and medium sized overstory trees (6-24" diameter) remain well above the desired range of 25-75 trees/acre, with 137.6 trees/acre pre-treatment and 133 trees/acre in the fifth-year post-treatment (YR05). A contract thin targeting small and medium sized trees would not only reduce hazard fuels but also promote resiliency in the remaining trees. If this is undertaken, care should be taken to vary the spacing and sizes of leave trees.

Live seedlings (<1" diameter) also require future treatment to meet the desired density of 2-20 seedlings per acre. The density of seedlings was 825 stems/acre before treatment, increased to 1,160 stems/acre by YR02, and ballooned to 29,234 stems/acre by YR05.

Vegetation: The native understory is recovering nicely. The percent cover increased by 134 percent between Pre-treatment and YR05. Understory species were very sparse before treatment (9.7 percent

cover), and declined further in YR02 (6.3 percent cover), but gained new ground in YR05 (22.7 percent cover). Although Ponderosa pine seedlings were the most plentiful species (6.9 percent cover), several shrubs and forbs were also common. The shrubs include Pacific serviceberry (*Amelanchier alnifolia*) and Common snowberry (*Symphoricarpos albus*) with a 2.5 and 2.0 percent cover, respectively. Common forbs include White catchfly (*Silene menziesii*) with 1.2 percent cover and Silky lupine (*Lupinus sericeus*) with 1.6 percent cover. Ross's sedge (*Carex rossi*) was also plentiful (3.0 percent cover).

Fuels: Consumption of large diameter fuels (1000 hrs) was the most impressive accomplishment of the pile-burns. The unit was a veritable tinderbox before the treatment with 154.7 tons/acre of large diameter fuels. The pile burns consumed over half, leaving 76.9 tons/acre in YR02. Fortunately, the fuels continued to decay to 25.9 tons/acre in YR05, closing in on the desired condition of 1-10 tons/acre.

Not surprisingly, the litter and duff and small diameter fuels did not change much with respect to the pile-burns. Litter and duff loadings were 28.2 tons/acre before treatment and 29.2 tons/acre in YR05. Small diameter fuels were 3.7 and 3.1 tons/acre in PRE and YR05, respectively.

Conclusions and Recommendations: The pile-burns did an excellent job of reducing fire hazard by consuming the majority of heavy downed woody fuels, although further treatment is still needed to reach the desired condition. The increase in shrubs and forbs in areas that had previously been impenetrable is another big achievement. These next steps should be considered:

- 1) An overstory thin is needed to reduce small and medium overstory trees by half. Trees should be marked to provide variation in tree sizes and spacing. Pole sized trees (<6") and large overstory trees (>24" dbh) should not be thinned.
- 2) An underburn or second thin and pile-burn treatment is needed to consume doghair thickets of new seedlings, and to reduce the remaining large woody dead and downed fuels by more than 60 percent.

B. Program Information

Table 4. Planning - 2020

Park	Does Park have written Desired Future Conditions? (yes or no)	Date Park-level Monitoring Plan completed (or revised)	Total # of Project- or Community-level Monitoring Plans (not just 2020)	Assisted with how many BAER/BAR plans in 2020?
Lake Roosevelt NRA	yes	2013	1	0
North Cascades NP	yes	2010, revision in progress	1	0
San Juan Island NHP	yes	1998	2	0
Olympic NP	no	unknown	0	0

Table 5. Monitoring - 2020

Park	% 2020 Data Entered	% 2020 Data Quality Checked	# Prescribed Fires Monitored*	# Non-fire Fuels Treatments Monitored*	# Wildfires Monitored *	# BAER/BAR Treatments Monitored*
Lake Roosevelt NRA	100%	100%	0	0	0	0
North Cascades NP	100%	100%	0	0	0	0
San Juan Island NHP	100%	100%	0	0	0	0
Olympic NP	100%	100%	0	0	0	0

* Number of treatment units with treatment effects monitoring conducted. Include pre-burn and post-burn monitoring but not burn-day monitoring.

n/a – no data collected or no monitoring required

Table 6. Communicating Results - 2020

Park	# of Project Monitoring Reports completed in 2020	# of Annual meeting(s) with Park staff	# of Formal presentations of results	Do you use Minitab?*
Lake Roosevelt NRA	1	1	0	no
North Cascades NP	1	1	0	no
San Juan Island NHP	1	0	0	no
Olympic NP	0	0	0	no

* n/a – no new data to report/present

JFSP Fire Science Exchange Networks - Karen Kopper is on the Advisory Board for the NW Fire Science Consortium.

Table 7. Research - 2020

Park	Are research needs identified in FMP or Monitoring Plan? (yes or no)	# of Proposals Submitted in 2020	# of Proposals Funded in 2020	# of Research Projects Supported in 2020*	Additional Comments
Lake Roosevelt NRA	yes	0	0	0	
North Cascades NP	yes	0	0	0	
San Juan Island NHP	yes	0	0	0	
Olympic NP	no	0	0	0	

*Number of funded research projects, new or ongoing, supported by the fire ecology program including logistical info or support, staffing, etc.

Reserve Fund Research

No Reserve Fund Research funding received this year. No previously funded project completed in the last year.

C. Fire ecologist accomplishments and areas of focus

Table 8. Fire Ecologist 2020 Accomplishments/Focus Areas

Category	Percent Time	Accomplishments and/or areas of activities
Planning	20	Westside prescriptions for FMP, READ guide revisions, GIS polygons for rx and thinning, SAJH Veg Plan
Presentations	2	Presentation of proposed monitoring for westside treatments, presentation of NOCA fire history to fire effects monitoring crew
NPS Meetings/ task groups	10	NOCA housing representative, Wilderness Rep
Interagency work	5	UW research collaborator, Pacific Wildland Fire Science Lab collaborator, Seattle City Light westside treatments
Wildfire assignments	0	No wildfires at NOCA, not available due to circumstances involving Covid
Prescribed fire projects	0	Not available due to circumstances involving Covid
Non-fire fuels projects	0	Not available due to circumstances involving Covid
Research	25	NOCA fire history, MORA fuelmap, Collaborator on UW projects
Data collection	0	Not available due to circumstances involving Covid restrictions
Data entry	2	Historical fire and weather data
Data analysis	15	NOCA fire history, SAJH herbicide treatment experiment
Supervision/Admin	20	Hiring, supervision, payroll, travel authorization/vouchers, purchasing, etc.
Training	2	READ training, NPS security and purchasing trainings
Travel out-of-park for plot or project work	0	Not available due to circumstances involving Covid
Miscellaneous	0	Things that don't fit in other categories – assistance to other work groups/projects (e.g. natural resources), etc.

D. Fire effects crew accomplishments and areas of focus

Table 9. Fire Effects Crew 2020 Accomplishments/Focus Areas

Category	Percent Time	Notes
Wildfire assignments	40	56 operational shifts as Lead READ, 43 operational shifts as REAF(t), 26 operational shifts at FEMO(t)
FMH plots	31	46 FMH plot reads at NOCA and LARO.
Travel out-of-park for plot or project work	6	Travel to NOCA, LARO, and SAJH for plot work
Supervision/Admin	5	Travel, payroll, credit card statements, vehicle maintenance, purchasing, hiring, performance evaluations, etc.
CBI plots	4	32 CBI reads at OLYM.
Other plot work	4	12 SAJH Brome experimental treatment plots (6 spring + 6 summer reads)
Training	3	Fire Refresher, required NPS trainings, aviation trainings, N-9042
Instruction	2	READ course instruction and curriculum preparation (Cedar)
Data analysis & Reporting	2	Data analysis, reporting, and completion of 2020 Year End Report
Rare Plant Surveys	1	Rare plant surveys for future fuels treatments at LARO
Data entry	1	Updated FMH species lists for all parks per ITIS and new <i>Flora of the Pacific Northwest</i> version. Labelling plot photos.
Resource Advisor Support	1	Participation in NWCG READ Subcommittee and support to NOCA READ program

E. 2021 Direction

The field season of 2021 will focus on installation of 30 FMH plots in 3 new west-side forest types. The plot installation is partly funded through Seattle City Light. The plot data will be used to model treatment prescriptions for the NOCA FMP revision and serve as Fire effects monitoring plots in the planned units. This work was expected to begin in 2020 but was delayed due to lack of housing for interns. Housing has been secured off of the NPS to insure that the work can be completed this coming summer.

F. Overall Data Entry Status and FFI suggestions

Program Data - In an effort to ensure the longevity of NPS fire effects monitoring data, please provide the following:

- FFI databases for which no new data were collected this year:
 - o WHMI
 - o JODA
 - o OLYM

- 90% of the total monitoring program data are in FFI. The other 10% of the data are fuel mapping data for MORA, NOCA, and OLYM which are stored as Microsoft Access databases.

FFI Feedback from Cedar Drake

- For the Surface Fuels protocol:
 - Automatically transfer transect slope between fine woody debris and coarse woody debris tabs.
 - Provide for the ability to save data on the fine woody debris tab without having every entry space filled. Currently it is only possible to save fuels data per transect by entering place holder values for 1, 10, and 100-hr fuels for all transects on the fine woody debris tab.
- Provide the ability for users to assign repeatable values in columns
- Automatically assign a default status of “X” to substrates (Ex. LITT, BARE, ROCK, SCAT)
- Provide the ability for users to associate certain codes with a default height = MOSS and LICHEN (0.01 m)
- For the Cover_Points (metric) protocol, provide the ability to automatically populate the next sample point with the last species entered on the previous sample point. This would increase efficiency in long stretches of similar vegetation.
- Provide a back (undo) button
- Provide the ability to create/edit drop down options for all columns
- Block the ability to enter the same monitoring status more than once to the master drop down list of monitoring statuses on the Project Management tab.
- In the Query tab...present the monitoring statuses in some kind of order.
- When a monitoring status for a plot read is changed for a sample event in the Project Management tab, have that automatically change the monitoring status assigned to that sample event in the Reports and Analysis tab. This appears to populate when you first create the sample event but if you close FFI and reopen this is no longer assigned and must be re-entered.
- Provide users with a “Copy, Cut, and Paste” functions. Such capability would significantly increase efficiency in data entry.
- Provide the ability to copy data sheets over from previous reads....similar to copying tree data from previous reads but for other protocols as well.

- In the Cover_Points (metric) protocol it would be extremely helpful to have a tool (button) that when pressed automatically changes the sample point number to the next subsequent value and populates the position number to “1”. Additionally, each added new row would automatically increase the position number while maintaining the sample point number. When a new sample point is measured then the data recorder can simply push the button to populate the next ascending sample point with a position number of “1”. This may seem like a minor point but consider that an average 50 meter herb transect line has 166 points often with an additional 50-100 rows of positional data. With two transect lines per plot this means that sample point and position points are each entered between 300-400 times per plot. It is a time consuming and tiring task for the data recorder and one that could easily be completed by FFI’s software.
- Please provide a toggled option in Surface Fuels tab to automatically populate Transect and Sample Location fields for Browns Lines fuel sampling in forested plots. This template of 40 points would be for Transect 1,2,3,4 each with sample locations of 1,5,10,15,20,25,30,35,40,45.
- Provide some means of mitigating issues related to multiple entries of the same species in the Species management tab. It is a ponderous task to consolidate these multiple entries into one entry for the species and “replace species in method data” for all occurrences of multiple species entries. When there are multiple entries with the same four letter code it is often confusing to decipher which code(s) are being recognized and worked with.
- Review of the nativity data in the Species Management tab. We have encountered repeated occurrences in which native/non-native assignments per species were incorrect.

FFI LITE Feedback

- Nearly all feedback comments mentioned in the FFI section apply to FFI Lite as well.
- **Provide the ability to toggle off drop down menus and/or drag them to a different location on the screen. Species drop down menus often get in the way when entering data.**
- Display Sample Event Monitoring Statuses on Project Management and Data Entry and Edit tabs in FFILITE. These appear in FFI but not in FFI-Lite.
- Provide the ability for users to enter plot visit date in Project Management in FFI-Lite and have it carry over to Project Management in FFI.
- Provide the ability for users to enter data points via voice command.



NPCB Fire Effects Monitors, Ian Woodruff and Noah Hirsch, conducting plot reads at SAJH